



## Getting Started

V2.0.0

06 April 2006

## Legal notice

### For customers in the U.S.A.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However there is no guarantee that interferences will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Use a different line outlet for the receiver.
- Consult a radio or TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment. The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart B of Part 15 of FCC Rules.

### For customers in Canada

This apparatus complies with the Class B limits for radio noise emissions set out in the Radio Interference Regulations.

### Pour utilisateurs au Canada

Cet appareil est conforme aux normes classe B pour bruits radioélectriques, spécifiées dans le Règlement sur le brouillage radioélectrique.

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# Introduction

## Document history

Version	Date	Remarks
PRE_V1.0.0	01.12.2006	New Manual - PRELIMINARY status
PRE_V1.0.1	01.03.2006	New Manual - PRELIMINARY status; minor corrections
V2.0.0	06.04.2006	New Manual - RELEASE status; added video modes and frame rates for Guppy F-033 / F-046 / F-080

Table 1: Document history

## Conventions used in this manual

To give this manual an easily understood layout and to emphasize important information, the following typographical styles and symbols are used:

### Styles

Style	Function	Example
Bold	Programs, inputs or highlighting important things	<b>bold</b>
Courier	Code listings etc.	Input
Upper case	Register	REGISTER
Italics	Modes, fields	<i>Mode</i>
Parentheses and/or blue	Links	(Link)

Table 2: Styles

### Symbols

**Note** This symbol highlights important information.



**Caution**

This symbol highlights important instructions. You have to follow these instructions to avoid malfunctions.



**www**

This symbol highlights URLs for further information. The URL itself is shown in blue.



Example:

<http://www.alliedvisiontec.com>

## Before operation

We place the highest demands for quality on our cameras. The Getting Started Manual is the guide to the installation of the GUPPY cameras. You will also find the specifications and interfaces here.

**Please read through this manual carefully before operating the camera.**

## Declarations of conformity

Allied Vision Technologies declares under its sole responsibility that the following products

Category Name	Model Name
Digital Camera (IEEE 1394)	Guppy F-025B
	Guppy F-025C
	Guppy F-029B
	Guppy F-029C
	Guppy F-033B
	Guppy F-033C
	Guppy F-036B
	Guppy F-036C
	Guppy F-046B
	Guppy F-046C
	Guppy F-080B
	Guppy F-080C

Table 3: Model names

to which this declaration relates are in conformity with the following standard(s) or other normative document(s):

- EN 55022
- EN 55024
- EN 61000
- FCC Class B

Following the provisions of 89/336/EEC directive(s), amended by directive 91/263 EEC, 92/31/EEC and 93/68/EEC.

**Note** Customer samples may not comply with above regulations.



## Safety instructions

### Note



- There are no switches or parts inside the camera that require adjustment. The guarantee becomes void upon opening the camera casing.
- If the product is disassembled, reworked or repaired by other than a recommended service person, AVT or its suppliers will take no responsibility for the subsequent performance or quality of the camera.
- The camera does NOT generate dangerous voltages internally. However, because the IEEE-1394a standard permits cable power distribution at voltages higher than 24 V, various international safety standards apply.

## Reference documents applicable in the United States

The reference documents include

- Information Processing and Business Equipment, UL 478
- National Electric Code, ANSI/NFPA 70
- Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75

## Reference documents applicable in Europe

The reference documents include materials to ensure European Union CE marking as follows:

- Telecommunications Terminal Equipment (91/263/EEC)
- EMC Directive (89/339/EEC)
- CE Marking Directive (93/68/EEC)
- LOW Voltage Directive (73/23/EEC) as amended by the CE Marking

## Reference documents applicable in Japan

The reference documents include:

- Electronic Equipment Technology Criteria by the Ministry of Trading and Industry (Similar to NFPA 70)



- Wired Electric Communication Detailed Law 17 by the Ministry of Posts and Telecom Law for Electric Equipment
- Dentori law issued by the Ministry of Trading and Industry
- Fire law issued by the Ministry of Construction

## Cautions

### Caution



- Make sure NOT to touch the shield of the camera cable connected to a computer and the ground terminal of the lines at the same time.
- Use only DC power supplies with insulated cases. These are identified by having only TWO power connectors.
- Although IEEE-1394a is functionally plug and play, the physical ports may be damaged by excessive ESD (electrostatic discharge), when connected under powered conditions. It is good practice to bring the metal part, which is the shield of the IEEE-1394 cable, in contact with the housing of the camera (before plugging it into the camera) and, at the other end, in contact with metal parts of the computer, before plugging it into the port of the computer. This ensures that excessive charge can flow safely to ground.
- If you feel uncomfortable with the previous advice, or if you have no knowledge about the connectivity of an installation, we strongly recommend powering down all systems before connecting or disconnecting a camera.

## Environmental conditions

Ambient temperature:

when camera in use (housing): + 5 °C ... + 50 °C

during storage: - 10 °C ... + 60 °C

Relative humidity:

20 % ... 80 % without condensation

Protection:

IP 30

## Guppy types and highlights

With Guppy cameras, entry into the world of digital image processing is simpler and more cost-effective than ever before.

With the new GUPPY, Allied Vision Technologies presents a whole series of attractive digital camera entry-level models of the FireWire™ type.

These products offer an unequalled price-performance relationship and make the decision to switch from using analogue to digital technology easier than ever before.

The AVT Guppy family consists of six very compact IEEE 1394 C-Mount cameras, which are equipped with highly sensitive high-quality sensors (CCD, CMOS).

Each of these cameras is available in black/white and color versions.

A large selection of different sensor sizes (type 1/2, type 1/3) and resolutions (VGA, SVGA, XGA) ensures the suitability of the cameras for all applications.

The Guppy family consists of the following models:

Guppy type	Sensor	Picture size	Frame rates
GUPPY F-025B/C	Type 1/3 SONY ICX404AL/AK Interlaced EIA CCD imager	(NTSC) 508 (h) x 492 (v)	up to 30 fps (60 fields per second)
GUPPY F-029B/C	Type 1/3 SONY ICX405AL/AK Interlaced CCIR CCD imager	(PAL) 500 (h) x 582 (v)	up to 25 fps (50 fields per second)
GUPPY F-033B/C	Type 1/3 Sony ICX424AL/AQ Progressive Scan CCD imager	(VGA) 656 (h) x 494 (v)	up to 60 fps
GUPPY F-036B/C	Type 1/3 Micron Imaging MT9V022 Global Shutter CMOS imager	(WideVGA) 752 (h) x 480 (v)	up to 60 fps
GUPPY F-046B/C	Type 1/2 Sony ICX415AL/AQ Progressive Scan CCD imager	(SVGA) 780 (h) x 582 (v)	up to 49 fps
GUPPY F-080B/C	Type 1/3 Sony ICX 204AL/AK Progressive Scan CCD imager	(XGA) 1032 (h) x 778 (v)	up to 30 fps

Table 4: GUPPY camera types

Operating in 8-bit mode (CCD b/w only), the cameras ensure very high quality images under almost all circumstances. The GUPPY is equipped with an asynchronous trigger shutter as well as true partial scan, and integrates a number of useful and intelligent smart features for image processing.

---

**Note**

- Color models are equipped with an **optical filter** to eliminate the influence of infrared light hitting the sensor. Please be advised that, as a side effect, this filter reduces sensitivity in the visible spectrum.
- B/w models are delivered with sensor protection glass to ensure maximum sensitivity. In certain applications and depending on the lighting source and optics, the use of either IR blocking or passing filter may be required to improve the image quality.
- CS-Mount models have the filter or protection glass mounted directly in front of the sensor. Taking out the filter is not possible at customer site. Ask your dealer for a camera with the respective filter already installed.
- C-Mount models have the filter or protection glass mounted in the CS- to C-Mount extension adapter. Ask your dealer for an extension adapter with the intended filter already mounted.
- Removing the C-Mount adapter opens the front section of the camera. This greatly enhances the risk for dust or particles to migrate on the sensor's protection glass. In order to remove the adapter:  
Hold the camera so that the adapter points downwards while changing the adapter. Use optical cleaning tissues for cleaning the sensor's protection glass if needed. Never use compressed air for cleaning purposes. Ask your dealer if you are not familiar with these procedures.

## System components

Each camera package consists of the following system components:



AVT Guppy



4.5m 1394 standard cable

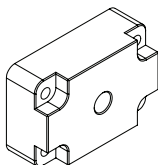


Color version:  
Jenofilt 217 IR cut filter (built-in)

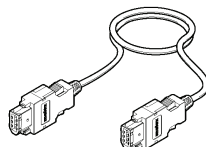
B/w version:  
only protection glass (no filter)



CD with driver and documentation



Optional: tripod adapter



Optional: 4.5m latching cable



Optional: HIROSE connector for  
cable mount HR25 7TP-8S

Figure 1: system components

The following illustration shows the spectral sensitivity of the IR cut filter:

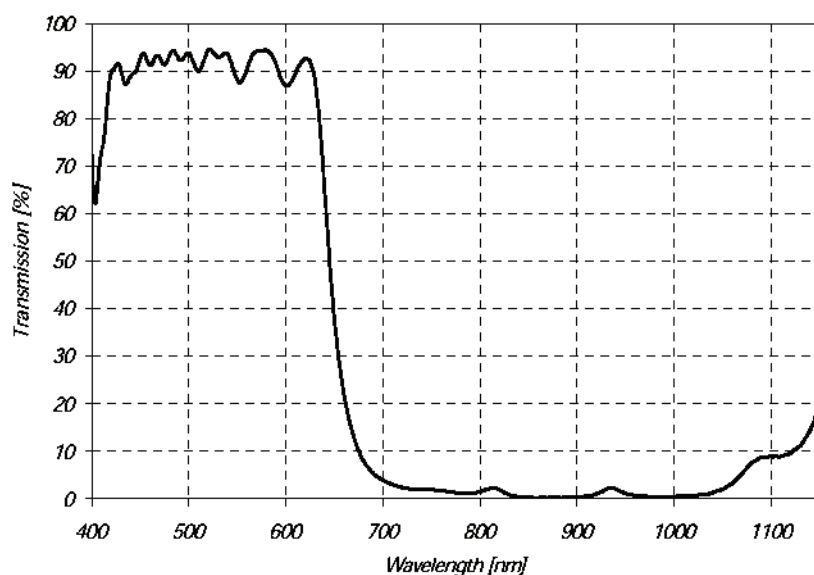


Figure 2: Spectral sensitivity of Jenofilt 217

#### Note



To demonstrate the properties of the camera, all examples in this manual are based on the **FirePackage** OHCI API software and the **SmartView** application.

#### www



These utilities can be obtained from Allied Vision Technologies (AVT). A free version of **SmartView** is available for download at:

[www.alliedvisiontec.com](http://www.alliedvisiontec.com)

#### Note



The camera also works with all IIDC (formerly DCAM) compatible IEEE 1394 programs and image processing libraries.

## Camera lenses

AVT offers different lenses from a variety of manufacturers. The following table lists selected image formats depending on camera type, distance and the focal width of the lens.

Focal Width for type 1/2 sensors Guppy F-046	Distance = 0.5 m	Distance = 1 m
4.8 mm	0.5 m x 0.67 m	1.0 m x 1.33 m
8 mm	0.3 m x 0.4 m	0.6 m x 0.8 m
12 mm	0.195 m x 0.26 m	0.39 m x 0.58 m
16 mm	0.145 m x 0.19 m	0.29 m x 0.38 m
25 mm	9.1 cm x 12.1 cm	18.2 cm x 24.2 cm
35 mm	6.4 cm x 8.51 cm	12.8 cm x 17.02 cm
50 mm	4.4 cm x 5.85 cm	8.8 cm x 11.7 cm

Table 5: Focal width vs. field of view (Guppy F-046)

Focal Width for type 1/3 sensors Guppy F-025/029/033/036/080	Distance = 0.5 m	Distance = 1 m
4.8 mm	0.375 m x 0.5 m	0.75 m x 1 m
8 mm	0.22 m x 0.29 m	0.44 m x 0.58 m
12 mm	0.145 m x 0.19 m	0.29 m x 0.38 m
16 mm	11 cm x 14.7 cm	22 cm x 29.4 cm
25 mm	6.9 cm x 9.2 cm	13.8 cm x 18.4 cm
35 mm	4.8 cm x 6.4 cm	9.6 cm x 12.8 cm
50 mm	3.3 cm x 4.4 cm	6.6 cm x 8.8 cm

Table 6: Focal width vs. field of view (Guppy F-025/029/033/036/080)

# Quick start with FirePackage

## Hardware conditions

- PC or laptop
- IEEE 1394 adapter (OHCI) or PC card with IEEE 1394 port(s)

### Note

AVT offers a wide range of IEEE 1394 adapters for different requirements.



## Operating system conditions

- Windows 2000
- Windows XP

## Software conditions

- Windows 2000/XP: **FirePackage**

### Note

The FirePackage includes a special IEEE 1394 driver from INTEK suitable for all AVT cameras.



## Overview FirePackage

- Install IEEE 1394 adapter (if PC or laptop does not have an IEEE 1394 port)
- Install FirePackage (incl. SmartView)
- Start SmartView or other viewer (FireView)
- Connect camera to PC or laptop
- License will automatically be read out from your AVT camera (in case of problems, call AVT support)
- Get your first image with SmartView
- Problems? Read Chapter [Troubleshooting](#) on page 19.

## Installing IEEE 1394 adapter

1. PC: Install the IEEE 1394 adapter according to the instructions you got from your adapter manufacturer.  
Laptop: Insert the IEEE 1394 PC Card into your laptop.  
Windows 2000/XP will detect the hardware automatically and installs a Windows 1394 driver.

## Installing FirePackage (incl. SmartView program)

### Note



Before installing FirePackage, open the following directory:

<CD ROM>:\products\AVTFirePackage...\

Read the documents you find in this directory:

- AVT\_FirePackage\_x\_y\_Release\_notes.pdf
- AVT\_FirePackage\_Overview.pdf
- AVT\_SmartView\_x.y.z\_Release\_notes.pdf

### Note



When you install FirePackage the SmartView program will automatically be installed.

Alternatively you can install the Direct FirePackage (then a special Viewer will be installed: see HTML-Help from this viewer).

1. Insert the Camera Support CD in the CD ROM drive of your PC or laptop.  
An html page will open if the autostart function of your PC or laptop is enabled.  
If the html page does not open, enter the root directory of the CD and doubleclick **index.htm**.
2. Scroll down to the software section **AVT FirePackage**.
3. Click the following links to read the corresponding documents:
  - AVT FirePackage Overview
  - Release Notes FirePackage
  - Release Notes SmartView
4. To start the installation of FirePackage click on **AVT FirePackage x.y.zip**  
A window opens.
5. Choose **Save to Disk** and click **OK**.
6. In the next window choose a directory and click **Save**.
7. Unzip the file.
8. Doubleclick on **setup.exe**.



A wizard will guide you through the installation. To go on click **Next** in each window.

9. You are asked to choose a directory: Accept the option shown or type another one. Click **Next**.
10. Activate all 3 check boxes. Click **Next** to start installation.

**AVT FirePackage** is being installed.

The INTEK window appears.

11. Now install the driver for the IEEE 1394 adapter: for each card to be used with **FirePackage**, activate the check box.
12. Click **Install**.
13. Ignore the message box (Microsoft non-certified driver) and continue the installation.

A wizard will guide you through the installation. To continue click **Next** in each window.

A window appears: FirePackage has been successfully installed.

14. Click **Close**.

Now the **FirePackage** and the **SmartView** Program are installed on your PC or laptop.

## Starting SmartView

The **SmartView** program:

- enables access to all connected IEEE 1394 cameras
  - supports almost all smart features of the AVT cameras.
1. Click **Start → Programs → Allied Vision Technologies → FirePackage → AVT\_SmartView**  
The **SmartView** window opens.
  2. Here you can see all 1394 buses and PCI slots (e.g. 0x040800).

## Connecting camera to PC or laptop

1. Insert one end of the FireWire cable into your 1394 adapter or 1394 PC card.
2. Insert the other end of the FireWire cable into your camera.

## Licensing

You need a license to run the FirePackage. This license is embedded in each AVT camera. It will be read out with the help of the license file **LICENSE.TXT**.

### Note



- **LICENSE.TXT** and **FCTLMAIN.DLL** always have to be in the same directory.
- By default the DLLs are used from the Windows System32 directory.
- If **FCTLMAIN.DLL** is not in the Windows System32 directory, then FirePackage will look in the directory where the Viewer (SmartView) is installed.

A typical license file for AVT cameras looks like this:

```
* FireControl License File
1EEAF9B450220075 Devicecontained Offset=F1000008 (AVT)
...
...
```

After the top line starting with \*, each line contains one license. The line after the top line is exactly as shown above.

The license file will be read from top to down until a valid license was found.

### Note



For further information on licensing read the following:

<install dir>\Allied Vision Technologies\FirePackage\Doc\  
Licensing.pdf

or ask your local dealer.

## First steps with SmartView

1. After connecting the camera with your PC or laptop, start **SmartView** program. In the **SmartView** window you see all FireWire adapters or cards installed in your PC.
2. In the **SmartView** window open all trees. Search for your camera and doubleclick on the camera entry.

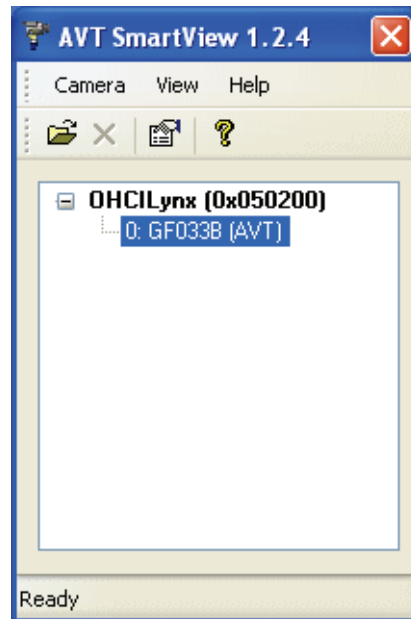


Figure 3: SmartView: example of GUPPY F-033B

3. A **SmartView** window opens and usually one first image is shot automatically.

## Troubleshooting

If the image is completely black, completely white or the image quality is poor, then try the following steps:

- If not done yet, remove the lens cap.
- If the image is black, open the aperture. If the image is white, close the aperture.
- If the image quality is poor, try changing the focus.

If you still don't get any image at all, then try the following steps:

- Check the FireWire plug of your camera and PC/laptop.
- Check the LEDs on the back of the camera. For further information read Chapter [Status LEDs](#) on page 65.

## Further steps with SmartView

The following table shows the most important functions of **SmartView** available through via the icon bar.






Icon	Function	Description
	FreeRun	Acquires images continuously
	MultiShot	Acquires multi images as set in the <b>Edit Settings → TriggerI/O tab → Multishot counter</b> combo box
	OneShot	Acquires only one image
	Edit Settings	<p>Opens a window</p> <p>Here you can adjust the settings for the standard registers, e.g. exposure time or gain (IIDC specification) and the settings for advanced AVT features.</p> <p>The following tabs are available:</p> <ul style="list-style-type: none"> <li>• Format</li> <li>• Control 1</li> <li>• Control 2</li> <li>• Trigger/IO</li> <li>• LUT/Shdg.</li> <li>• Adv 1</li> <li>• Adv 2</li> </ul> <p>Some settings can only be changed when the camera is in idle mode.</p>
	Direct Access	<p>Opens a window (Direct Access dialog box)</p> <p>Here you can change all registers and addresses of the AVT camera manually: standard and advanced features.</p> <p>All settings can be changed while the camera is running, although some features will only take effect after you stop and rerun the camera.</p>

Table 7: Important functions of SmartView

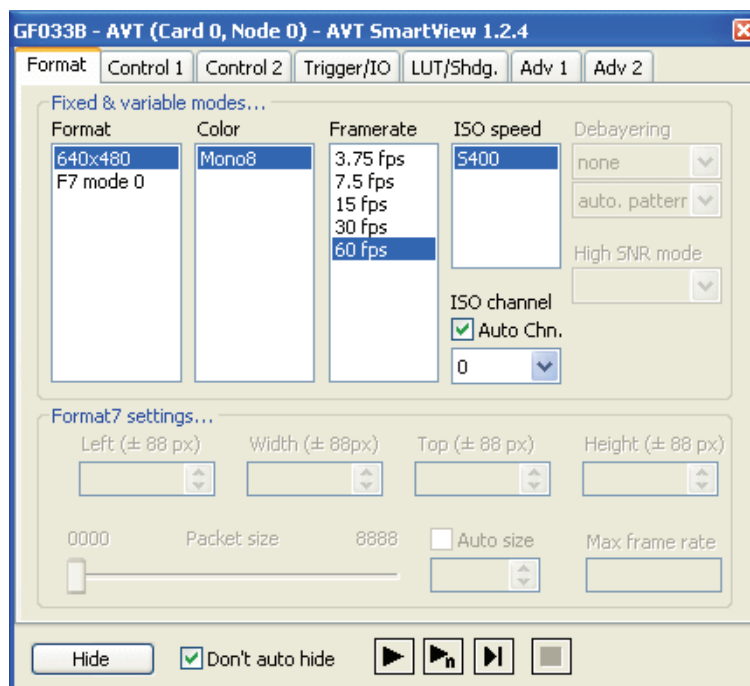


Figure 4: SmartView: example of Edit Settings dialog (GUPPY F-033B)

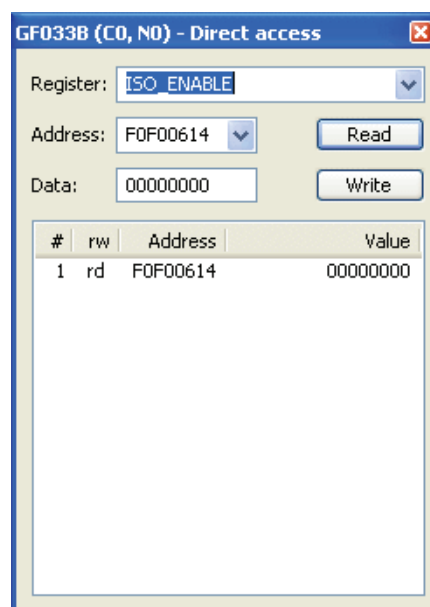


Figure 5: SmartView: example of DirectAccess dialog (GUPPY F-033B)

# Quick start with DirectFirePackage

## Hardware conditions

- PC or laptop
- IEEE 1394 adapter (OHCI) or PC card with IEEE 1394 port(s)

### Note

AVT offers a wide range of IEEE 1394 adapters for different requirements.



## Operating system conditions

- Windows 2000 SP 4
- Windows XP

## Software conditions

The following package uses the Windows 1394 driver:

- Windows 2000/XP: **DirectFirepackage**

## Overview DirectFirePackage

- Install IEEE 1394 adapter (if PC or laptop does not have an IEEE 1394 port). Windows 2000/XP will detect the hardware automatically and will install a Windows 1394 driver.
- Connect camera to PC or laptop
- Install DirectFirePackage
- Start SmartView for WDM
- Get your first image with SmartView for WDM
- Problems? Read Chapter [Troubleshooting](#) on page 26.

## Installing IEEE 1394 adapter

1. PC: Install the IEEE 1394 adapter according to the instructions you got from your adapter manufacturer.  
Laptop: Insert the IEEE 1394 PC Card into your laptop.  
Windows 2000/XP detects the hardware automatically and installs a Windows 1394 driver.

## Connecting camera to PC or laptop

1. Insert one end of the FireWire cable into the 1394 adapter of your 1394 PC card.
2. Insert the other end of the FireWire cable into your camera.  
Under Windows XP the **Found New Hardware Wizard** window opens.
3. Click **Cancel**.

## Installing DirectFirePackage

### Note



For further information about DirectFirePackage, ActiveX and WDM open the following directory:

<CD ROM>:\products\wdm\WDM\_xxyzz\

Read the documents you find in this directory:

- English
  - ActiveX\_eng.pdf (User Manual ActiveX Control)
  - manual\_eng.pdf (User Manual DirectFirePackage)
  - WDM Introduction.pdf (Introduction of WDM)
- German
  - ActiveX.pdf (Benutzerhandbuch ActiveX Control)
  - manual\_ger.pdf (Handbuch DirectFirePackage)
  - WDM Grundwissen.pdf (Grundwissen zu WDM)

### Note



The **SmartView for WDM** program is also installed when you install DirectFirePackage.

1. Insert the Camera Support CD in the CD ROM drive of your PC or laptop.  
If the autostart function of your PC or laptop is enabled, an html page will open.

If the html page does not open, go in the root directory of the CD and doubleclick **index.htm**.

2. On the html page scroll down to the software section  
**AVT DirectFirePackage.**
3. On the html page click the following links to read the corresponding documents:
  - Release Notes
  - Programmers Manual
  - Documentation ActiveX-Controls (English)
  - Introduction of WDM (English)
4. To start the installation of DirectFirePackage:  
on the html page click on  
**Setup (complete with DirectX9 Installation)**  
or  
in the CD tree doubleclick  
**<CD ROM>:\products\wdm\WDM\_140805\DirectFire Package.exe**  
A window opens.
5. Choose language and click **OK**.  
A wizard will guide you through the installation. To continue click **Next**  
in each window.
6. Click **Next**.
7. Enter your **Full Name** and **Organization** and click **Next**.
8. Choose **Typical** and click **Next**.  
The program is being installed. Files are copied. This will take some  
time.  
A hardware installation message window opens.
9. Click **Continue Anyway**.
10. In the DOS box: Press any key!
11. Click **Finish**.

Now the **DirectFirePackage** and the **SmartView for WDM** program are  
installed on your PC or laptop.



## Starting SmartView for WDM

The SmartView for WDM program:

- enables access to all connected IEEE 1394 cameras
- supports almost all smart features of the AVT Guppy cameras.

1. Click **Start → Programs → Allied Vision Technologies → FirePackage → SmartView for WDM**

The **Select a camera** window opens.

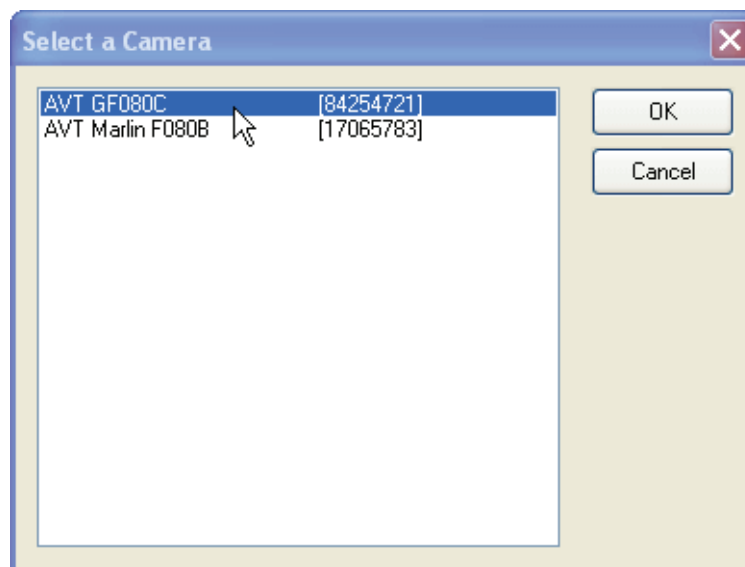


Figure 6: SmartView for WDM: example of the Select a Camera window

2. Here you can see all the digital cameras connected to your IEEE1394 ports.
3. Select your AVT Guppy camera and click **OK**.

## First steps with SmartView for WDM

After selecting your AVT Guppy camera, the **SmartView for WDM** window opens and the first image is shot automatically.

## Troubleshooting

If the image is completely black, completely white or the image quality is poor, then try the following steps:

- If not done yet, remove the lens cap.
- If the image is black, open the aperture. If the image is white, close the aperture.
- If the image quality is poor, try changing the focus.
- In the **SmartView for WDM** window click on menu **Camera → Settings**. The **Setting** window opens. On **Format** tab try other **video formats** and **frame rates**.

If you still don't get any image at all, then try the following steps:

- Check the FireWire plug of your camera and PC/laptop.
- Check the LEDs on the back of the camera. For further information read Chapter [Status LEDs](#) on page 65.

## Further steps with SmartView for WDM

The following table shows the most important functions of **SmartView for WDM** available via the icon bar.




Icon	Function	Description
	FreeRun	Acquires images continuously
	MultiShot	Acquires multi images: <b>Multishot</b> window opens, in <b>Picture Count</b> combo box choose a number and click <b>OK</b> .
	OneShot	Acquires only one image

Table 8: Important functions of SmartView for WDM

Icon	Function	Description
<p>There is no icon</p> <p>In menu click on <b>Camera → Settings Dialog...</b></p>	Edit Settings	<p>Opens a window</p> <p>Here you can adjust the settings for the standard registers, e.g. exposure time or gain (IIDC specification) and the settings for advanced AVT features.</p> <p>The following tabs are available:</p> <ul style="list-style-type: none"> <li>• Format</li> <li>• Control 1</li> <li>• Control 2</li> <li>• Trigger &amp; IO</li> <li>• LUT &amp; Shdg.</li> <li>• Adv 1</li> <li>• Adv 2</li> <li>• CMOS</li> </ul> <p>Some settings can only be changed when the camera is in idle mode.</p>
<p>There is no icon</p> <p>In menu click on <b>Camera → Direct Access...</b></p>	Direct Access	<p>Opens a window (Direct Access dialog box)</p> <p>Here you can change manually all registers and addresses of the AVT camera: standard and advanced features.</p> <p>All settings can be changed while the camera is running, although some features will take affect after you stop and rerun the camera.</p>

Table 8: Important functions of SmartView for WDM

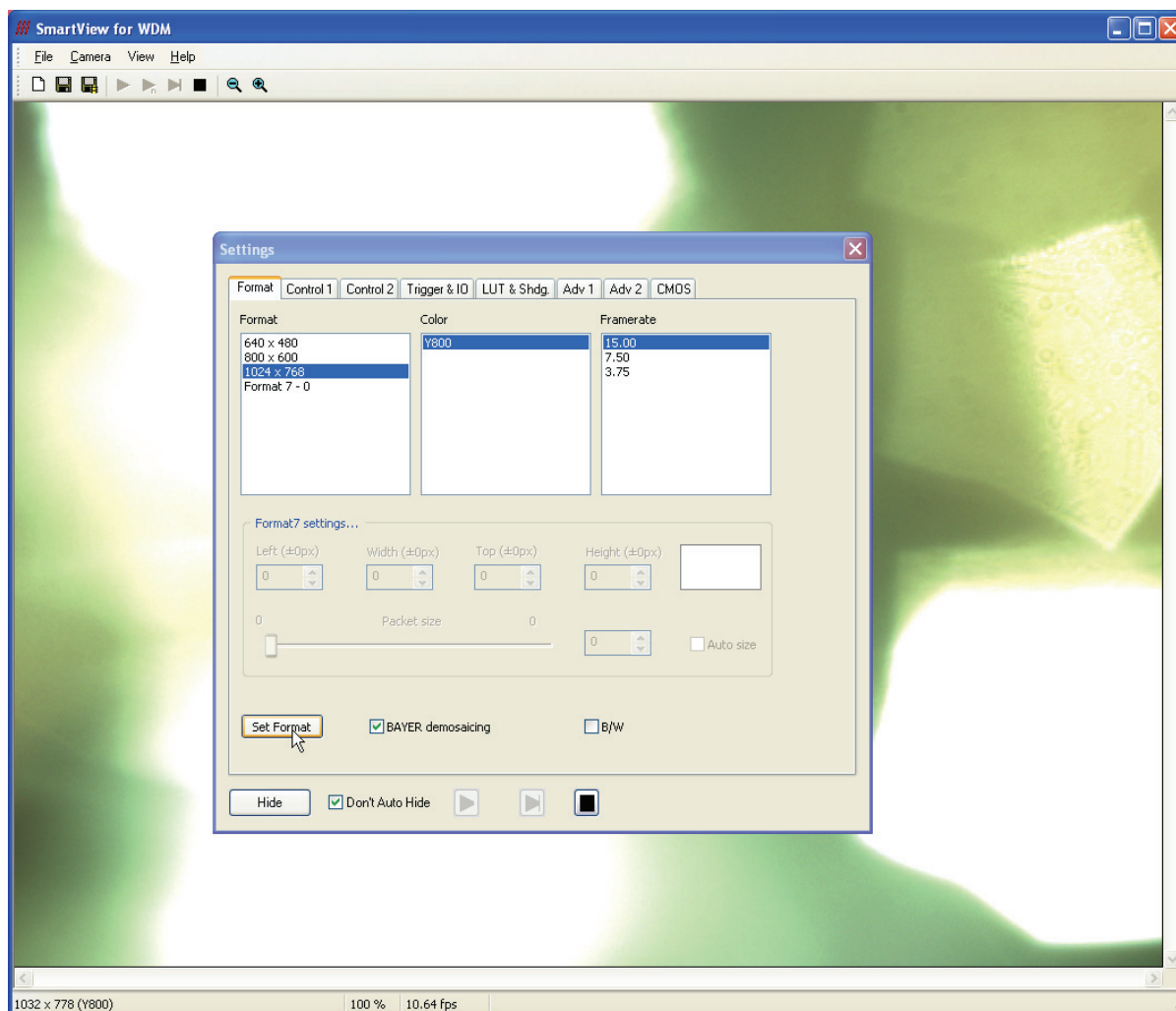


Figure 7: SmartView for WDM: example of Format tab in the Settings window

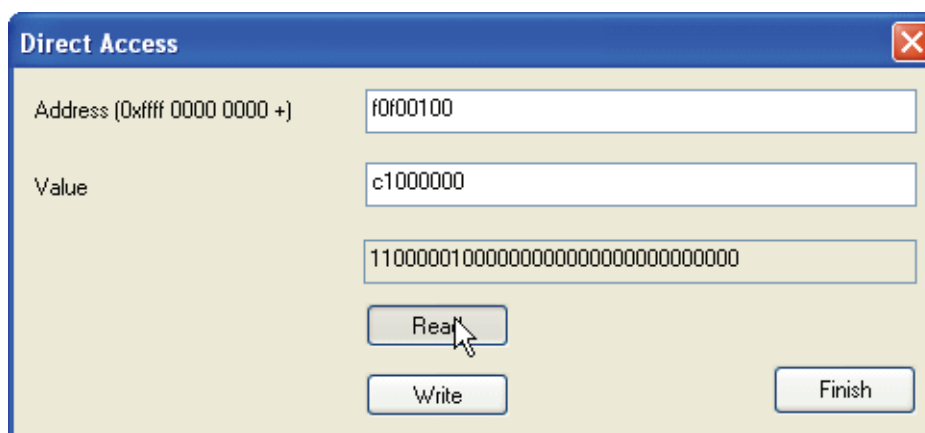


Figure 8: Smart View for WDM: example of Direct Access dialog box

# Quick start with Fire4Linux

## Hardware conditions

- PC or laptop (x86 compatible system, Intel or AMD processor)
- IEEE 1394 adapter (OHCI) or PC card with IEEE 1394 port(s)

### Note

AVT offers a wide range of IEEE 1394 adapters for different requirements.



## Operating system conditions

- Linux (installation packages for SUSE min. 6.2, RedHat/Fedora; general packages for other Linux distributions)
- for all Linux distributions: min. Kernel 2.68

## Software conditions

- libraw1394
- libdc1394
- Fire4Linux (consists of libavt1394 and cc1394)

## Overview Fire4Linux

### Note



Read the following documentation:

- Open the following directory:  
<CD ROM>:\products\linux\AVT\_Fire4Linux\_x.y\
- Read the documents you find in this directory:
  - English: Fire4Linux\_vx.y\_Introduction.pdf
  - English: AVT Cameras and Linux.pdf
  - German: Fire4Linux\_vx.y\_Einführung.pdf
  - German: AVT Kameras und Linux.pdf
- Optional: open the following directory:  
<CD ROM>:\products\linux\Coriander\
- Optional: read the documents you find in this directory:
  - English: coriander-doc-x.y.z.pdf
  - Further reading:

<http://sourceforge.net/projects/coriander/Coriander>

Coriander is a full-featured GUI for IEEE1394, IIDC-compliant (a.k.a DCAM) digital cameras. It includes camera control, video display, saving, FTP and V4L export.

SUSE	other Linux distributions
<ul style="list-style-type: none"> <li>• Install IEEE 1394 adapter (if PC or laptop does not have an IEEE 1394 port)</li> </ul>	
<ul style="list-style-type: none"> <li>• Install package with YaST (libavt, cc1394)</li> </ul>	<ul style="list-style-type: none"> <li>• Check if Kernel modules exist:               <ul style="list-style-type: none"> <li>– OHCI 1394</li> <li>– VIDEO1394</li> <li>– RAW1394</li> </ul> </li> <li>• Install libraw1394</li> <li>• Install libdc1394</li> <li>• Check if devices are created</li> <li>• Optional: install coriander (free viewer for industrial applications)</li> <li>• Install cc1394 (AVT viewer)</li> </ul>

Table 9: Overview Fire4Linux: SUSE and other Linux Distributions



SUSE	other Linux distributions
Connect camera to PC or laptop:	
<ul style="list-style-type: none"><li>• Insert one end of the FireWire cable into your 1394 adapter or into your 1394 PC card in your laptop.</li><li>• Insert the other end of the FireWire cable into your camera.</li></ul>	
<ul style="list-style-type: none"><li>• Get your first image with <b>cc1394</b> (AVT viewer)</li></ul>	
<ul style="list-style-type: none"><li>• Problems? Read Chapter <a href="#">Troubleshooting</a> on page 34.</li></ul>	

Table 9: Overview Fire4Linux: SUSE and other Linux Distributions

## Installing IEEE 1394 adapter

1. PC: Install the IEEE 1394 adapter according to the instructions you got from your adapter manufacturer.  
Laptop: Insert the IEEE 1394 PC Card into your laptop.

## First steps with cc1394

1. Start **cc1394**.  
The **cc1394** window opens and takes automatically continuous images.

## Troubleshooting

If the image is completely black, completely white or the image quality is poor, then try the following steps:

- If not done yet, remove the lens cap.
- If the image is black, open the aperture. If the image is white, close the aperture.
- If the image quality is poor, try changing the focus.
- In the **cc1394** window click on the following menus and try other settings:
  - **Format**
  - **Resolution**
  - **Framerate**
  - **Color-coding**

If you still don't get any image at all, then try the following steps:

- Check the FireWire plug of your camera and PC/laptop.
- Check the LEDs on the back of the camera. For further information read Chapter [Status LEDs](#) on page 65.

## Further steps with cc1394

The following table shows the most important functions of **cc1394** available via the menu bar.

Menu	Function	Description
1. In menu click on: <b>Adjustments → Picture Controls...</b> 2. Click <b>Trigger</b> tab. 3. In <b>Capture Mode</b> combo box click <b>Free-Run</b> .	Free-run	Acquires images continuously (default)
1. In menu click on: <b>Adjustments → Picture Controls...</b> 2. Click <b>Trigger</b> tab. 3. In <b>Capture Mode</b> combo box click <b>Multi-Shot</b> .	Multi-shot	Acquires multi images: in <b>Number of Frames</b> combo box choose a number
1. In menu click on: <b>Adjustments → Picture Controls...</b> 2. Click <b>Trigger</b> tab. 3. In <b>Capture Mode</b> combo box click <b>One-Shot</b> .	One-shot	Acquires only one image

Table 10: Important functions of cc1394

Menu	Function	Description
In menu click on: <b>Adjustments → Picture Controls...</b>	Edit Settings	<p>Opens a window</p> <p>Here you can adjust the settings for the standard registers, e.g. exposure time or gain (IIDC specification) and the settings for advanced AVT features.</p> <p>The following tabs are available:</p> <ul style="list-style-type: none"> <li>• Main</li> <li>• Contrast1</li> <li>• Contrast2</li> <li>• Exposure</li> <li>• Color</li> <li>• Trigger</li> <li>• I/O</li> <li>• Partial Image</li> <li>• Auto Functions</li> <li>• Advanced</li> </ul> <p>Some settings can only be changed when the camera is in idle mode.</p>
In menu click on: <b>Adjustments → Direct Register Manipulation...</b>	Direct Access	<p>Opens a window (Direct Access dialog box)</p> <p>Here you can change manually all registers and addresses of the AVT camera: standard and advanced features.</p> <p>All settings can be changed while the camera is running, although some features will take affect after you stop and rerun the camera.</p>

Table 10: Important functions of cc1394

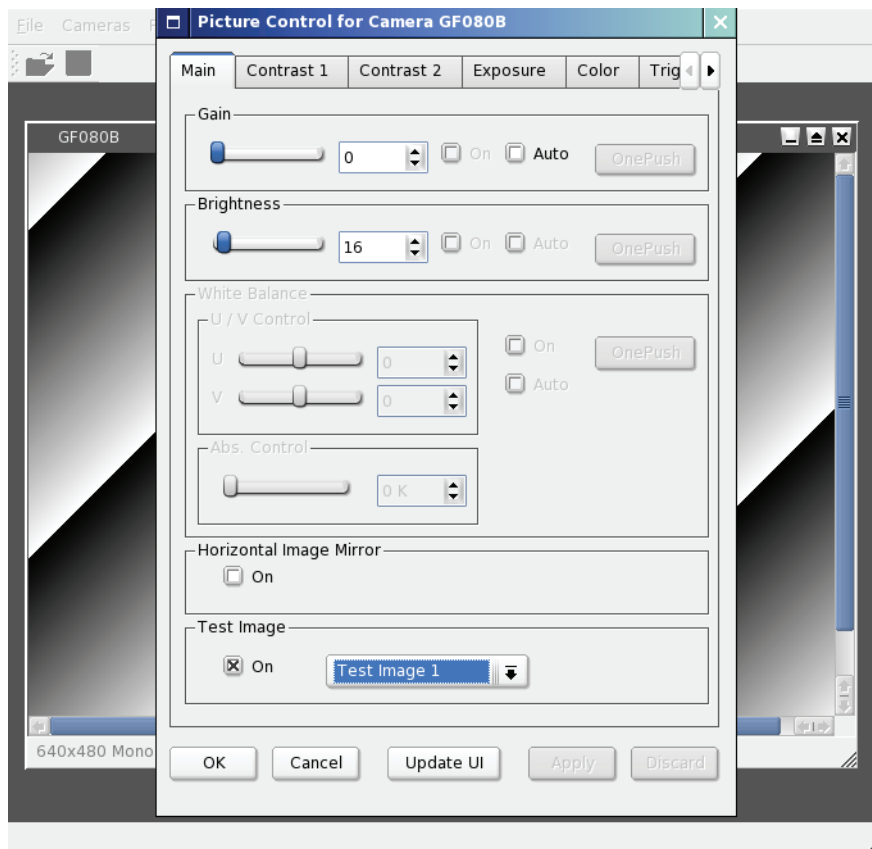


Figure 9: Example of Picture Control with cc1394 (GUPPY F-080B)

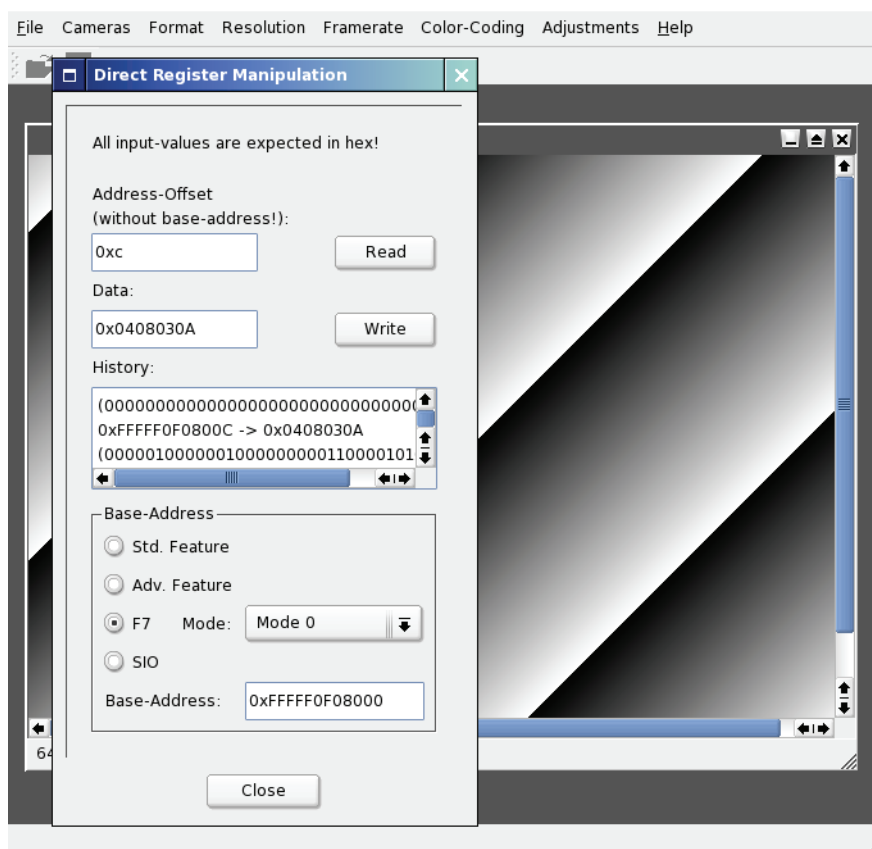


Figure 10: Example of Direct Register Manipulation window

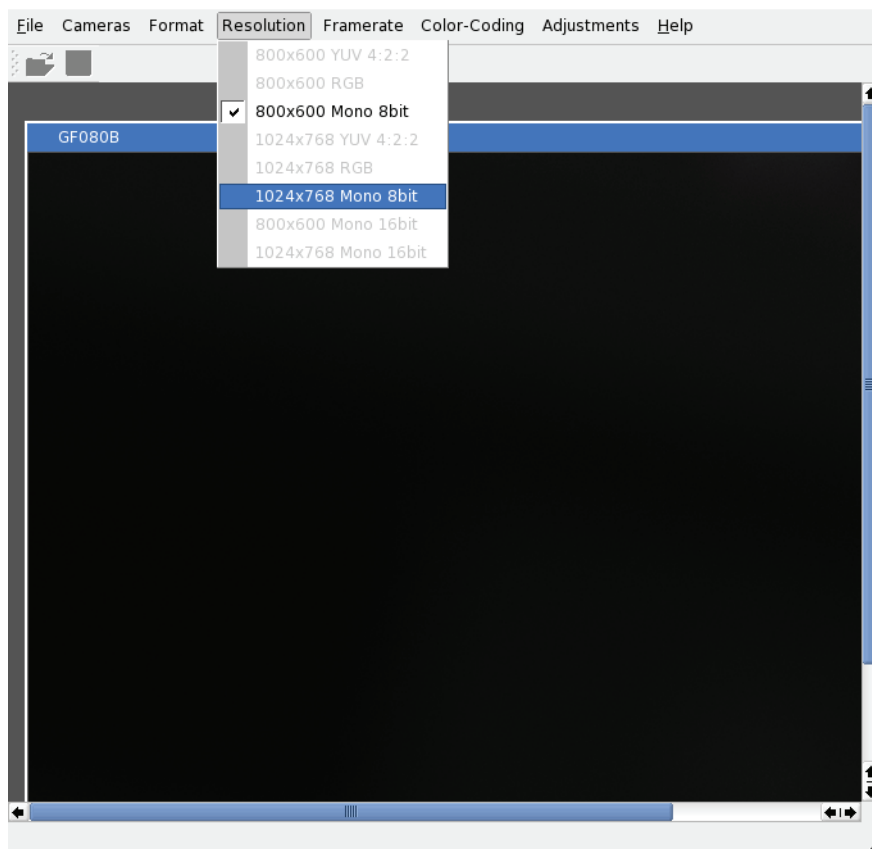


Figure 11: Example of changing resolution with cc1394 (GUPPY F-080B)

# Specifications

## Guppy F-033B

Feature	Specification
Image device	ICX424AL (diag. 6 mm; type 1/3) progressive scan SONY IT CCD
Effective picture elements	658 (H) x 494 (V)
Lens mount	C-Mount: 17.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back to filter distance: 9.5 mm (see <a href="#">Figure 26: Guppy C-Mount dimensions</a> on page 60) CS-Mount: 12.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back distance: 8 mm (see <a href="#">Figure 27: Guppy CS-Mount dimensions</a> on page 61)
Picture sizes	640 x 480 pixels (Format_0) 656 x 494 pixels (Format_7 Mode_0)
Cell size	7.4 µm x 7.4 µm
ADC	10 bit
Data path	8 bit
Frame rates	3.75 fps; 7.5 fps; 15 fps; 30 fps; 60 fps variable frame rates in Format_7 up to 58 fps
Gain Control	Manual: 0-24 dB (0.0351 dB/step); Auto gain (select. AOI)
Shutter speed	20 ... 67.108.864 µs (~67s); Auto shutter (select. AOI)
External trigger shutter	Trigger_Mode_0, Trigger_Mode_1, Advanced feature: Trigger_Mode_15 (bulk); Trigger delay
Look Up Table	One, user programmable (10 bit → 8 bit); gamma (0.5)
Smart functions	AGC (Auto Gain Control), AEC (Auto Exposure Control), LUT (Look Up Table) one configurable input, three configurable outputs, RS-232 Port (serial port, IIDC v. 1.31)
Transfer rate	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Digital interface	IEEE 1394 IIDC v. 1.3, Single Port
Power requirements	DC 8 V - 36 V via IEEE 1394 cable or 8-pin HIROSE
Power consumption	Less than 2 watt (@ 12 V DC)
Dimensions	48.2 mm x 30 mm x 30 mm (L x W x H); w/o tripod and lens
Mass	50 g (without lens)
Operating temperature	+5 ... +50 °Celsius

Table 11: Specification Guppy F-033B



Feature	Specification
Storage temperature	-10 ... +60 °Celsius
Regulations	EN 55022, EN61000, EN55024, FCC Class B, DIN ISO 9022, ROHS in preparation
Options	<ul style="list-style-type: none"><li>• Board level OEM version</li><li>• C-Mount: IR cut filter / IR pass filter available as CS- to C-Mount adapter.</li><li>• CS-Mount: Consult factory or your dealer for specific filters.</li><li>• AVT FirePackage (SDK and Viewer, 100% control the bus)</li><li>• AVT Direct FirePackage (SDK and Viewer, compatible to DirectX and WDM)</li><li>• AVT Fire4Linux (SDK and Viewer, compatible to RedHat and Suse Distributions)</li></ul>

Table 11: Specification Guppy F-033B

**Note**

The design and specifications for the products described above may change without notice.



## Guppy F-033C

Feature	Specification
Image device	ICX424AQ (diag. 6 mm; type 1/3) progressive scan SONY IT CCD
Effective picture elements	658 (H) x 494 (V)
Lens mount	C-Mount: 17.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back to filter distance: 9.5 mm (see <a href="#">Figure 26: Guppy C-Mount dimensions</a> on page 60) CS-Mount: 12.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back distance: 8 mm (see <a href="#">Figure 27: Guppy CS-Mount dimensions</a> on page 61)
Picture sizes	640 x 480 pixels (Format_0) 656 x 494 pixels (Format_7 Mode_0)
Cell size	7.4 µm x 7.4 µm
ADC	10 bit
Color modes	Raw8
Data path	8 bit
Frame rates	3.75 fps; 7.5 fps; 15 fps; 30 fps; 60 fps variable frame rates in Format_7 up to 58 fps
Gain control	Manual: 0-24 dB (0.0351 dB/step); Auto gain (select. AOI)
Shutter speed	20 ... 67.108.864 µs (~67s); Auto shutter (select. AOI)
External trigger shutter	Trigger_Mode_0, Trigger_Mode_1, Advanced feature: Trigger_Mode_15 (bulk); Trigger delay
Look Up Table	One, user programmable (10 bit → 8 bit); gamma (0.5)
Smart functions	AGC (Auto Gain Control), AEC (Auto Exposure Control), AWB (Auto White Balance), LUT (Look Up Table) one configurable input, three configurable outputs, RS-232 Port (serial port, IIDC v. 1.31)
Transfer rate	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Digital interface	IEEE 1394 IIDC v. 1.3, Single Port
Power requirements	DC 8 V - 36 V via IEEE 1394 cable or 8-pin HIROSE
Power consumption	Less than 2 watt (@ 12 V DC)
Dimensions	48.2 mm x 30 mm x 30 mm (L x W x H); w/o tripod and lens
Mass	50 g (without lens)
Operating temperature	+5 ... +50 °Celsius
Storage temperature	-10 ... +60 °Celsius
Regulations	EN 55022, EN61000, EN55024, FCC Class B, DIN ISO 9022, ROHS in preparation

Table 12: Specification Guppy F-033C

Feature	Specification
Options	<ul style="list-style-type: none"><li>• Board level OEM version</li><li>• AR coated protection glass</li><li>• AVT FirePackage (SDK and Viewer, 100% control the bus)</li><li>• AVT Direct FirePackage (SDK and Viewer, compatible to DirectX and WDM)</li><li>• AVT Fire4Linux (SDK and Viewer, compatible to RedHat and Suse Distributions)</li></ul>

Table 12: Specification Guppy F-033C

**Note**

The design and specifications for the products described above may change without notice.



## Guppy F-046B

Feature	Specification
Image device	ICX415AL (diag. 8 mm; type 1/2) progressive scan SONY IT CCD
Effective picture elements	782 (H) x 582 (V)
Lens mount	C-Mount: 17.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back to filter distance: 9.5 mm (see <a href="#">Figure 26: Guppy C-Mount dimensions</a> on page 60) CS-Mount: 12.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back distance: 8 mm (see <a href="#">Figure 27: Guppy CS-Mount dimensions</a> on page 61)
Picture sizes	640 x 480 pixels (Format_0) 780 x 582 pixels (Format_7 Mode_0)
Cell size	8.3 µm x 8.3 µm
ADC	12 bit
Data path	8 bit
Frame rates	3.75 fps; 7.5 fps; 15 fps; 30 fps; 60 fps variable frame rates in Format_7 up to 49.4 fps
Gain control	Manual: 0-24 dB (0.0351 dB/step); Auto gain (select. AOI)
Shutter speed	20 ... 67.108.864 µs (~67s); Auto shutter (select. AOI)
External trigger shutter	Trigger_Mode_0, Trigger_Mode_1, Advanced feature: Trigger_Mode_15 (bulk); Trigger delay
Look Up Table	One, user programmable (10 bit → 8 bit); gamma (0.5)
Smart functions	AGC (Auto Gain Control), AEC (Auto Exposure Control), LUT (Look Up Table) one configurable input, three configurable outputs, RS-232 Port (serial port, IIDC v. 1.31)
Transfer rate	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Digital interface	IEEE 1394 IIDC v. 1.3, Single Port
Power requirements	DC 8 V - 36 V via IEEE 1394 cable or 8-pin HIROSE
Power consumption	Less than 2 watt (@ 12 V DC)
Dimensions	48.2 mm x 30 mm x 30 mm (L x W x H); w/o tripod and lens
Mass	50 g (without lens)
Operating temperature	+5 ... +50 °Celsius
Storage temperature	-10 ... +60 °Celsius
Regulations	EN 55022, EN61000, EN55024, FCC Class B, DIN ISO 9022, ROHS in preparation

Table 13: Specification Guppy F-046B

Feature	Specification
Options	<ul style="list-style-type: none"><li>• Board level OEM version</li><li>• C-Mount: IR cut filter / IR pass filter available as CS- to C-Mount adapter.</li><li>• CS-Mount: Consult factory or your dealer for specific filters.</li><li>• AVT FirePackage (SDK and Viewer, 100% control the bus)</li><li>• AVT Direct FirePackage (SDK and Viewer, compatible to DirectX and WDM)</li><li>• AVT Fire4Linux (SDK and Viewer, compatible to RedHat and Suse Distributions)</li></ul>

Table 13: Specification Guppy F-046B

**Note**

The design and specifications for the products described above may change without notice.



## Guppy F-046C

Feature	Specification
Image device	ICX415AQ (diag. 8 mm; type 1/2) progressive scan SONY IT CCD
Effective picture elements	782 (H) x 582 (V)
Lens mount	C-Mount: 17.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back to filter distance: 9.5 mm (see <a href="#">Figure 26: Guppy C-Mount dimensions</a> on page 60) CS-Mount: 12.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back distance: 8 mm (see <a href="#">Figure 27: Guppy CS-Mount dimensions</a> on page 61)
Picture sizes	640 x 480 pixels (Format_0) 780 x 582 pixels (Format_7 Mode_0)
Cell size	8.3 µm x 8.3 µm
ADC	12 bit
Color modes	Raw8
Data path	8 bit
Frame rates	3.75 fps; 7.5 fps; 15 fps; 30 fps; 60 fps variable frame rates in Format_7 up to 49.4 fps
Gain control	Manual: 0-24 dB (0.0351 dB/step); Auto gain (select. AOI)
Shutter speed	20 ... 67.108.864 µs (~67s); Auto shutter (select. AOI)
External trigger shutter	Trigger_Mode_0, Trigger_Mode_1, Advanced feature: Trigger_Mode_15 (bulk); Trigger delay
Look Up Table	One, user programmable (10 bit → 8 bit); gamma (0.5)
Smart functions	AGC (Auto Gain Control), AEC (Auto Exposure Control), AWB (Auto White Balance), LUT (Look Up Table) one configurable input, three configurable outputs, RS-232 Port (serial port, IIDC v. 1.31)
Transfer rate	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Digital interface	IEEE 1394 IIDC v. 1.3, Single Port
Power requirements	DC 8 V - 36 V via IEEE 1394 cable or 8-pin HIROSE
Power consumption	Less than 2 watt (@ 12 V DC)
Dimensions	48.2 mm x 30 mm x 30 mm (L x W x H); w/o tripod and lens
Mass	50 g (without lens)
Operating temperature	+5 ... +50 °Celsius
Storage temperature	-10 ... +60 °Celsius
Regulations	EN 55022, EN61000, EN55024, FCC Class B, DIN ISO 9022, ROHS in preparation

Table 14: Specification Guppy F-046C

Feature	Specification
Options	<ul style="list-style-type: none"><li>• Board level OEM version</li><li>• AR coated protection glass</li><li>• AVT FirePackage (SDK and Viewer, 100% control the bus)</li><li>• AVT Direct FirePackage (SDK and Viewer, compatible to DirectX and WDM)</li><li>• AVT Fire4Linux (SDK and Viewer, compatible to RedHat and Suse Distributions)</li></ul>

Table 14: Specification Guppy F-046C

**Note**

The design and specifications for the products described above may change without notice.



## Guppy F-080B

Feature	Specification
Image device	ICX204AL (diag. 6 mm; type 1/3) progressive scan SONY IT CCD
Effective picture elements	1034 (H) x 778 (V)
Lens mount	C-Mount: 17.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back to filter distance: 9.5 mm (see <a href="#">Figure 26: Guppy C-Mount dimensions</a> on page 60) CS-Mount: 12.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back distance: 8 mm (see <a href="#">Figure 27: Guppy CS-Mount dimensions</a> on page 61)
Picture sizes	1024 x 768 pixels (Format_1) supporting all smaller fixed formats 1032 x 778 (Format_7 Mode_0)
Cell size	4.65 µm x 4.65 µm
ADC	12 bit
Data path	8 bit
Frame rates	3.75 Hz; 7.5 Hz; 15 Hz variable frame rates in Format_7 up to 30 fps
Gain control	Manual: 0-24 dB (0.0351 dB/step); Auto gain (select. AOI)
Shutter speed	20 ... 67.108.864 µs (~67s); Auto shutter (select. AOI)
External trigger shutter	Trigger_Mode_0, Trigger_Mode_1, Advanced feature: Trigger_Mode_15 (bulk); image transfer by command; Trigger delay
Look Up Table	One, user programmable (10 bit → 8 bit); gamma (0.5)
Smart functions	AGC (Auto Gain Control), AEC (Auto Exposure Control), LUT (Look Up Table) one configurable input, three configurable outputs, RS-232 Port (serial port, IIDC v. 1.31)
Transfer rate	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Digital interface	IEEE 1394 IIDC v. 1.3
Power requirements	DC 8 V - 36 V via IEEE 1394 cable or 8-pin HIROSE
Power consumption	Less than 2 watt (@ 12 V DC)
Dimensions	48.2 mm x 30 mm x 30 mm (L x W x H); without tripod and lens
Mass	50 g (without lens)
Operating temperature	+5 ... +50 °Celsius
Storage temperature	-10 ... +60 °Celsius

Table 15: Guppy F-080B



Feature	Specification
Regulations	EN 55022, EN 61000, EN 55024, FCC class B, DIN ISO 9022
Options	<ul style="list-style-type: none"><li>• Board level OEM version</li><li>• C-Mount: IR cut filter / IR pass filter available as CS- to C-Mount adapter.</li><li>• CS-Mount: Consult factory or your dealer for specific filters.</li><li>• AVT FirePackage (SDK and Viewer, 100% control the bus)</li><li>• AVT Direct FirePackage (SDK and Viewer, compatible to DirectX and WDM)</li><li>• AVT Fire4Linux (SDK and Viewer, compatible to RedHat and Suse Distributions)</li></ul>

Table 15: Guppy F-080B

**Note**

The design and specifications for the products described above may change without notice.



## Guppy F-080C

Feature	Specification
Image device	ICX204AK (diag. 6 mm; type 1/3) progressive scan SONY IT CCD
Effective picture elements	1034 (H) x 778 (V)
Lens mount	C-Mount: 17.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back to filter distance: 9.5 mm (see <a href="#">Figure 26: Guppy C-Mount dimensions</a> on page 60) CS-Mount: 12.526 mm (in air), Ø 25.4 mm (32 tpi), mechanical flange back distance: 8 mm (see <a href="#">Figure 27: Guppy CS-Mount dimensions</a> on page 61)
Picture sizes	1024 x 768 pixels (Format_1) supporting all smaller fixed formats 1032 x 778 (Format_7 Mode_0)
Cell size	4.65 µm x 4.65 µm
ADC	12 bit
Color modes	Raw8
Data path	8 bit
Frame rates	3.75 Hz; 7.5 Hz; 15 Hz variable frame rates in Format_7 up to 30 fps
Gain control	Manual: 0-24 dB (0.0351 dB/step); Auto gain (select. AOI)
Shutter speed	20 ...67.108.864 µs (~67s); Auto shutter (select. AOI)
External trigger shutter	Trigger_Mode_0, Trigger_Mode_1, Advanced feature: Trigger_Mode_15 (bulk); image transfer by command; Trigger delay
Look Up Table	One, user programmable (10 bit → 8 bit); gamma (0.5)
Smart functions	AGC (Auto Gain Control), AEC (Auto Exposure Control), AWB (Auto White Balance), LUT (Look Up Table) one configurable input, three configurable outputs, RS-232 Port (serial port, IIDC v. 1.31)
Transfer rate	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Digital interface	IEEE 1394 IIDC v. 1.3
Power requirements	DC 8 V - 36 V via IEEE 1394 cable or 8-pin HIROSE
Power consumption	Less than 2 watt (@ 12 V DC)
Dimensions	48.2 mm x 30 mm x 30 mm (L x W x H); without tripod and lens
Mass	50 g (without lens)
Operating temperature	+5 ... +50 °Celsius
Storage temperature	-10 ... +60 °Celsius

Table 16: Guppy F-080C

Feature	Specification
Regulations	EN 55022, EN 61000, EN 55024, FCC class B, DIN ISO 9022
Options	<ul style="list-style-type: none"><li>• Board level OEM version</li><li>• AR coated protection glass</li><li>• AVT FirePackage (SDK and Viewer, 100% control the bus)</li><li>• AVT Direct FirePackage (SDK and Viewer, compatible to DirectX and WDM)</li><li>• AVT Fire4Linux (SDK and Viewer, compatible to RedHat and Suse Distributions)</li></ul>

Table 16: Guppy F-080C

**Note**

The design and specifications for the products described above may change without notice.



## Spectral sensitivity

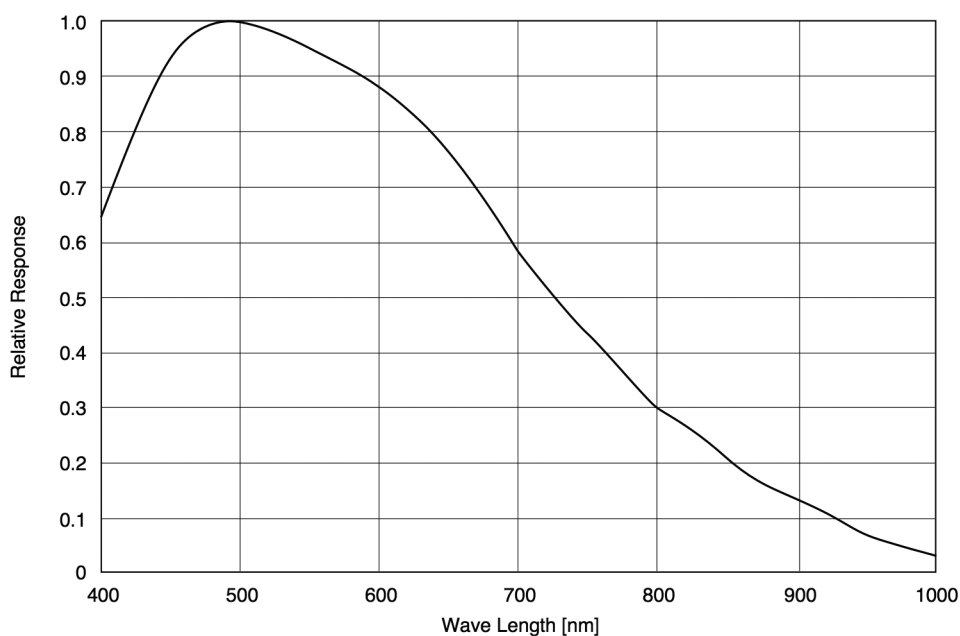


Figure 12: Spectral sensitivity of Guppy F-025B without cut filter and optics

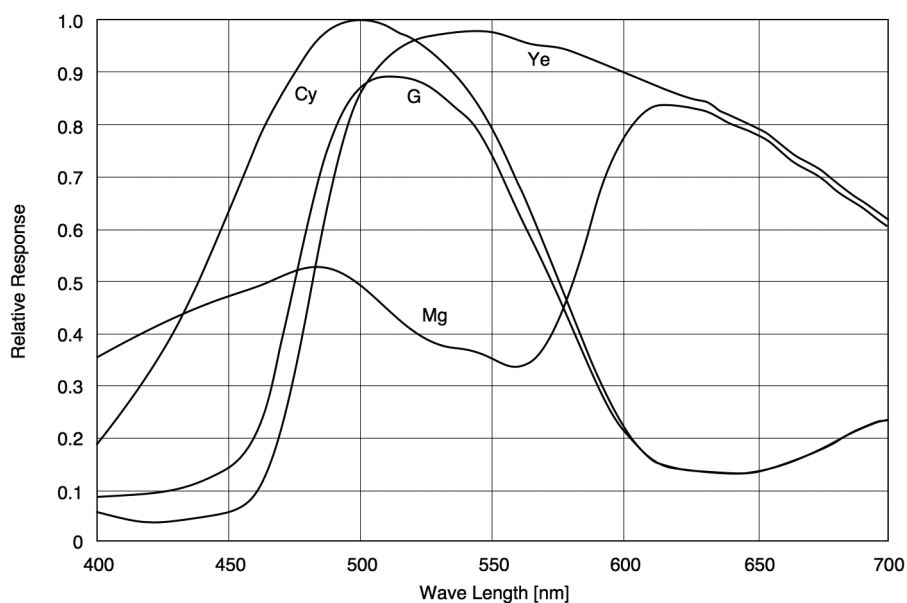


Figure 13: Spectral sensitivity of Guppy F-025C without cut filter and optics

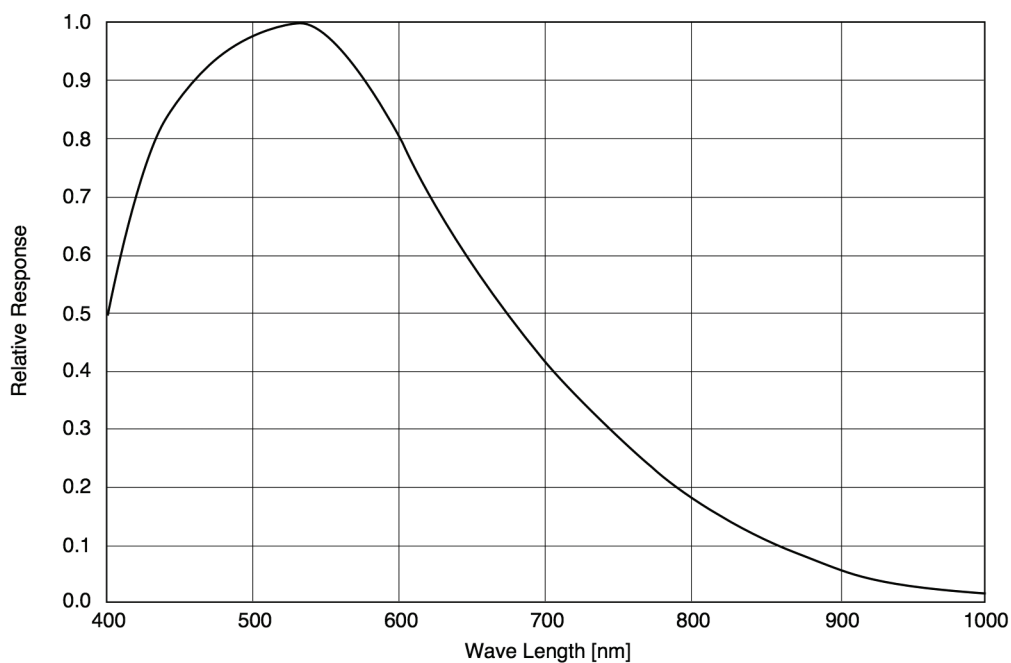


Figure 14: Spectral sensitivity of Guppy F-029B without cut filter and optics

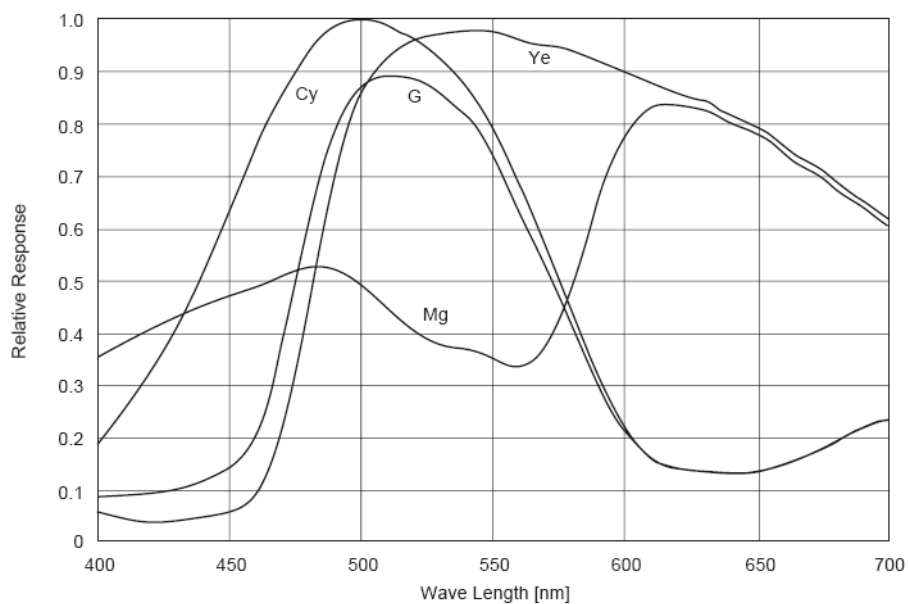


Figure 15: Spectral sensitivity of Guppy F-029C without cut filter and optics

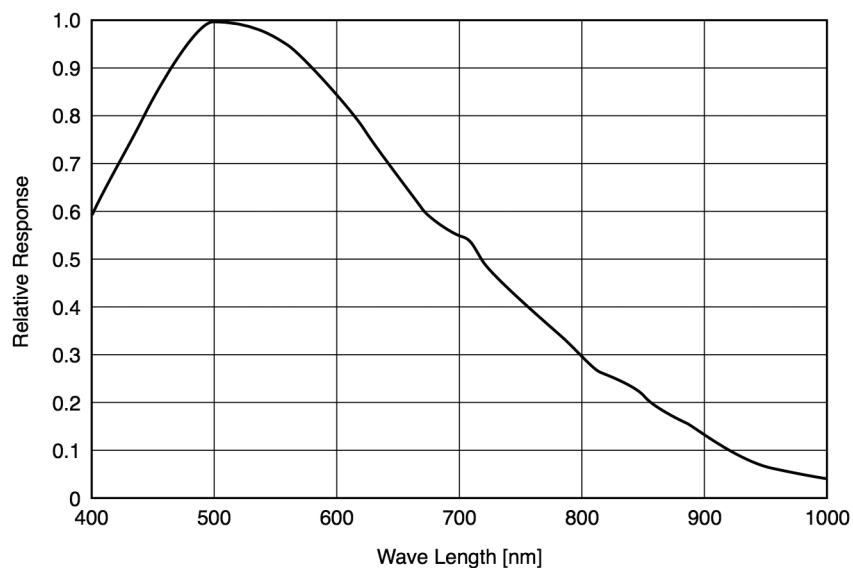


Figure 16: Spectral sensitivity of Guppy F-033B without cut filter and optics

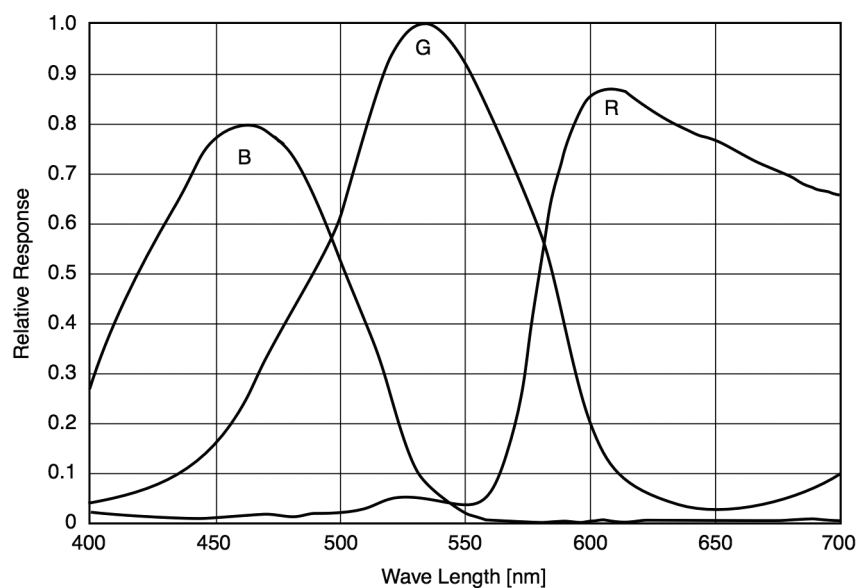


Figure 17: Spectral sensitivity of Guppy F-033C without cut filter and optics

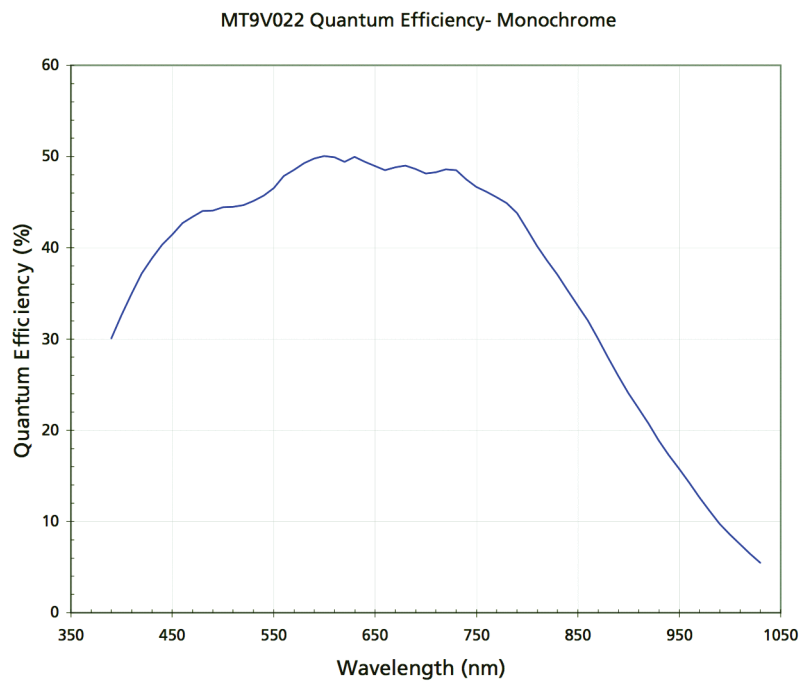


Figure 18: Spectral sensitivity of Guppy F-036B without cut filter and optics

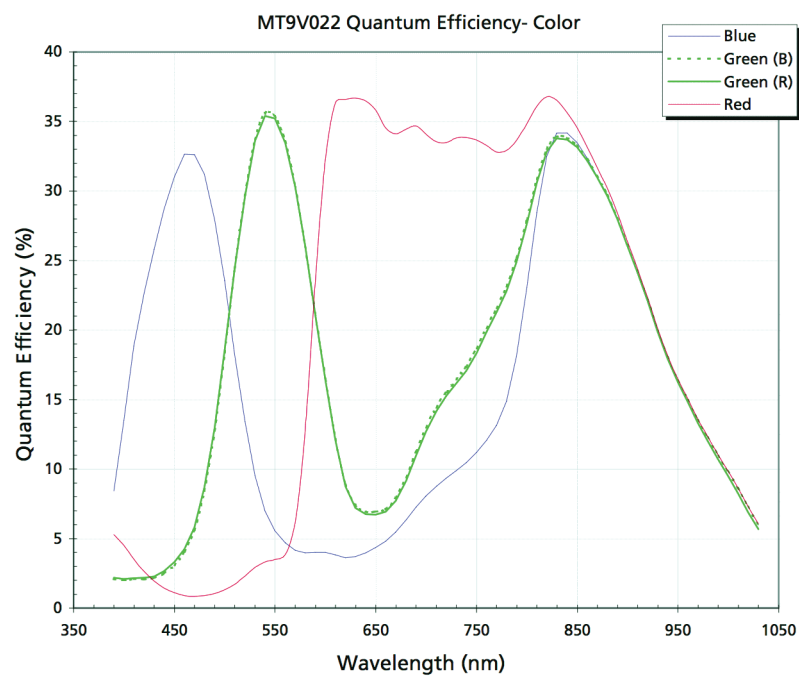


Figure 19: Spectral sensitivity of Guppy F-036C without cut filter and optics

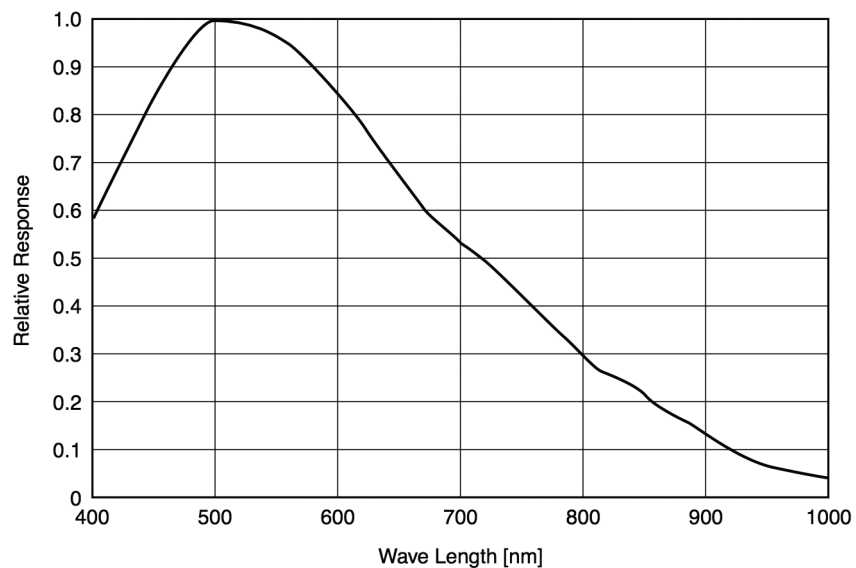


Figure 20: Spectral sensitivity of Guppy F-046B without cut filter and optics

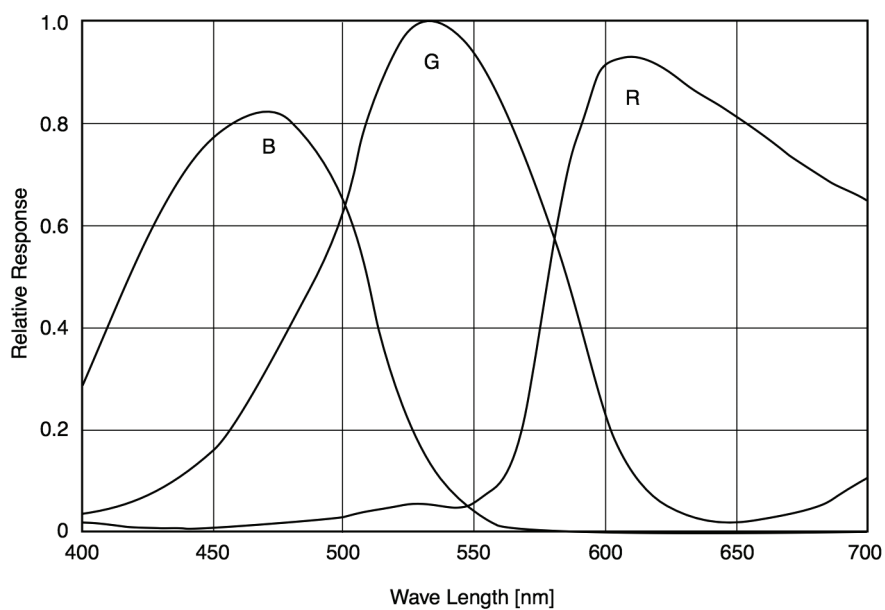


Figure 21: Spectral sensitivity of Guppy F-046C without cut filter and optics



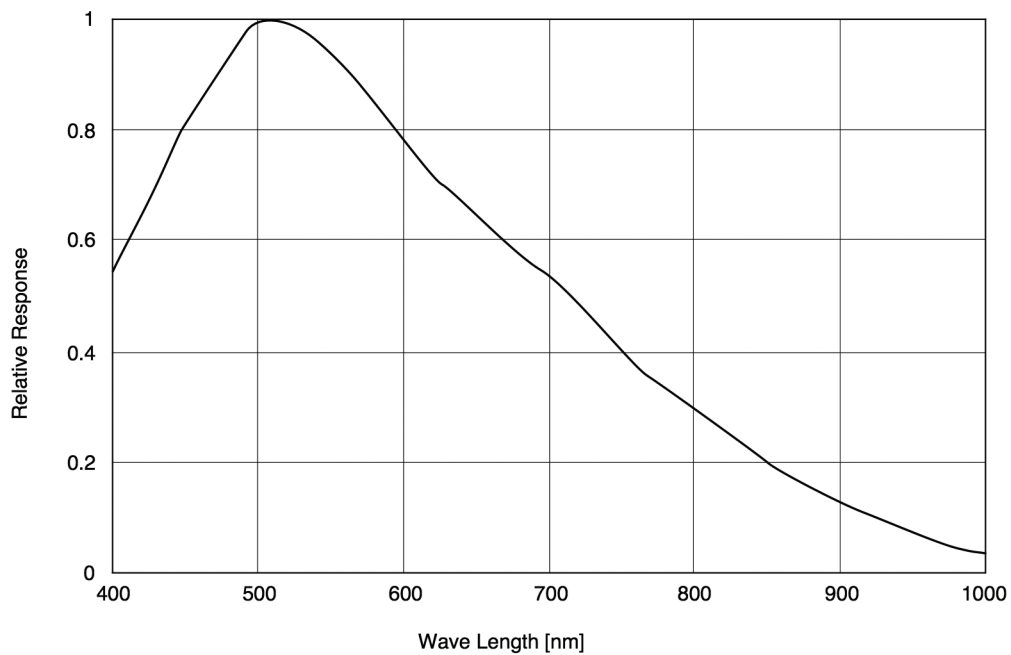


Figure 22: Spectral sensitivity of Guppy F-080B without cut filter and optics

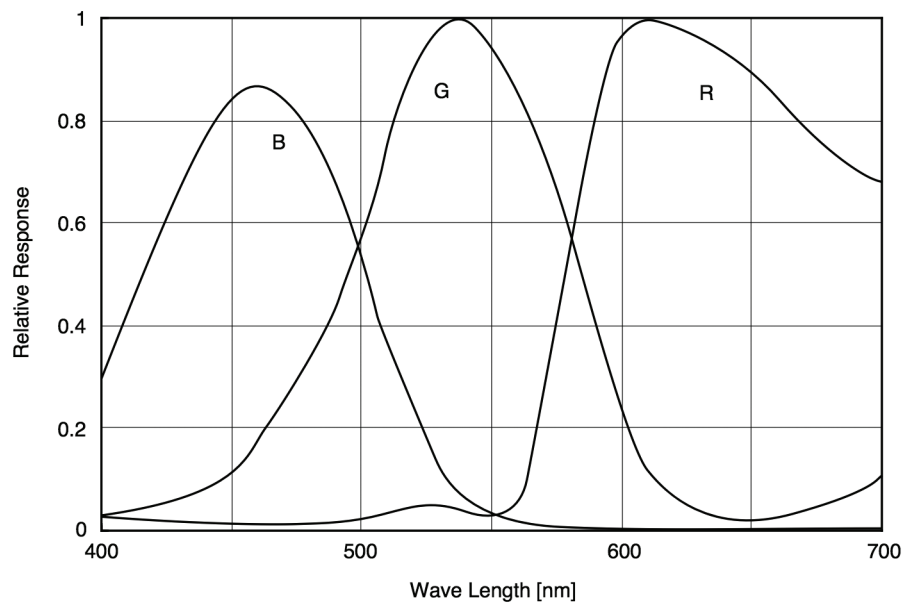
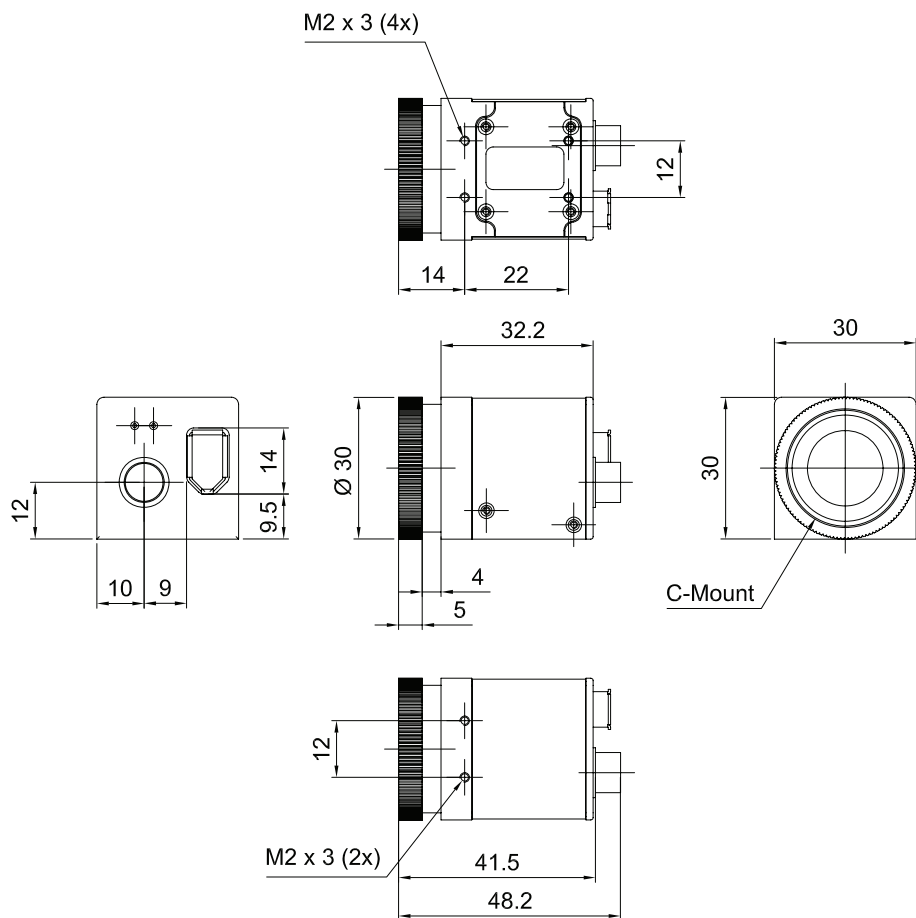


Figure 23: Spectral sensitivity of Guppy F-080C without cut filter and optics

# Camera dimensions

## Guppy standard housing



Body size: 48.2 mm x 30 mm x 30 mm (L x W x H)  
Weight: 50 g (without lens)

Figure 24: Camera dimensions

## Tripod adapter

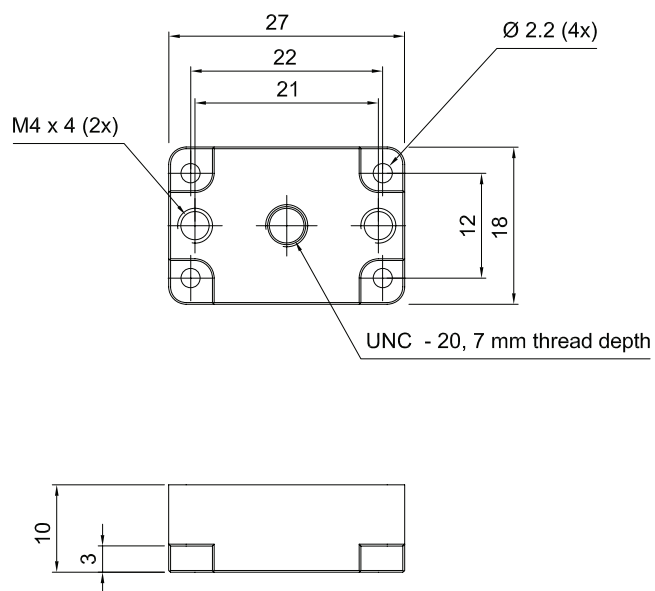


Figure 25: Tripod dimensions

## Cross section: C-Mount

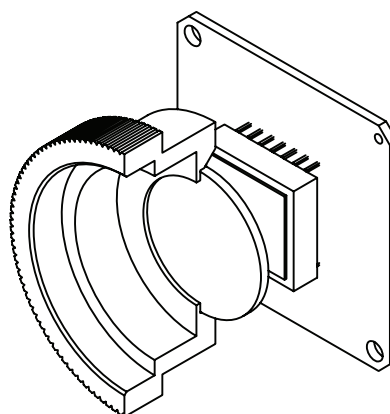
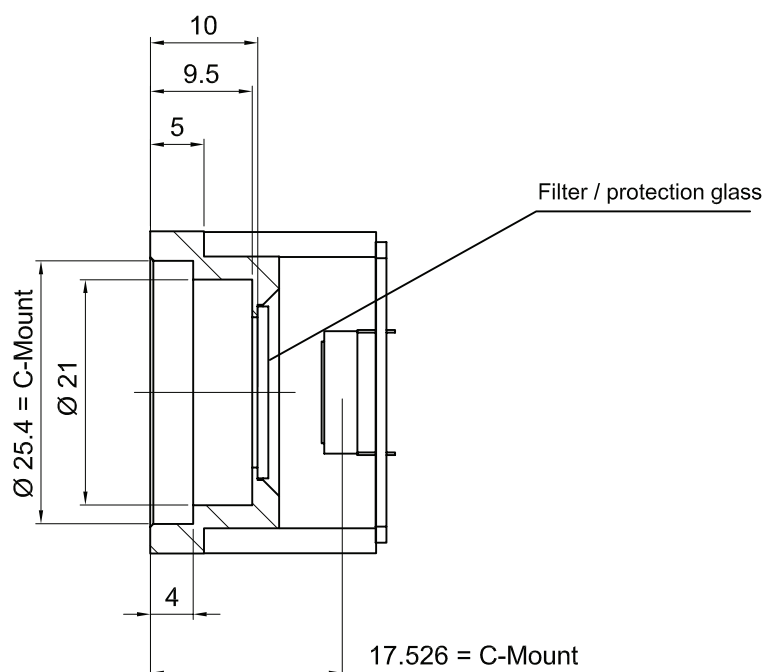


Figure 26: Guppy C-Mount dimensions

## Cross section: CS-Mount

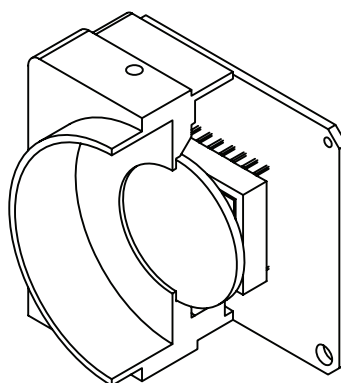
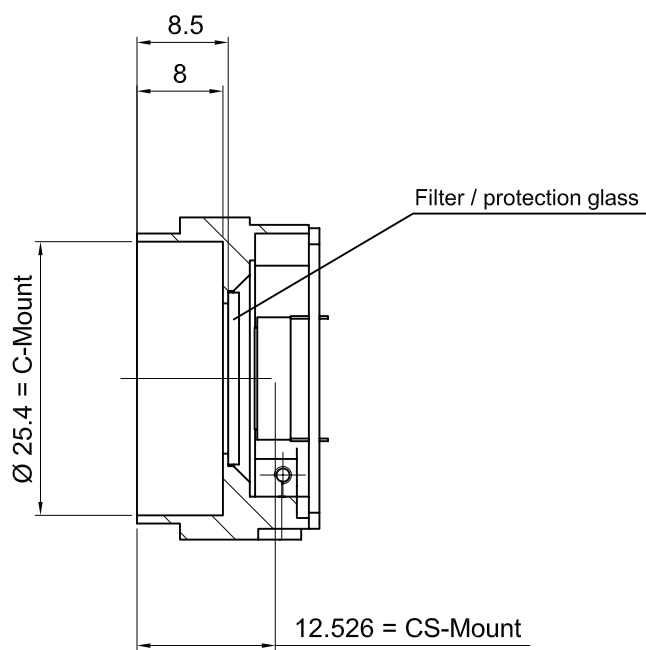


Figure 27: Guppy CS-Mount dimensions

## Camera interfaces

In addition to the two status LEDs (see Chapter [Status LEDs](#) on page 65), there are two jacks located at the rear of the camera.

- The 8-pin camera I/O connector provides a variety of control input and output lines.
- The IEEE-1394 connector with lock mechanism provides access to the IEEE-1394 bus and thus makes it possible to control the camera and output frames.

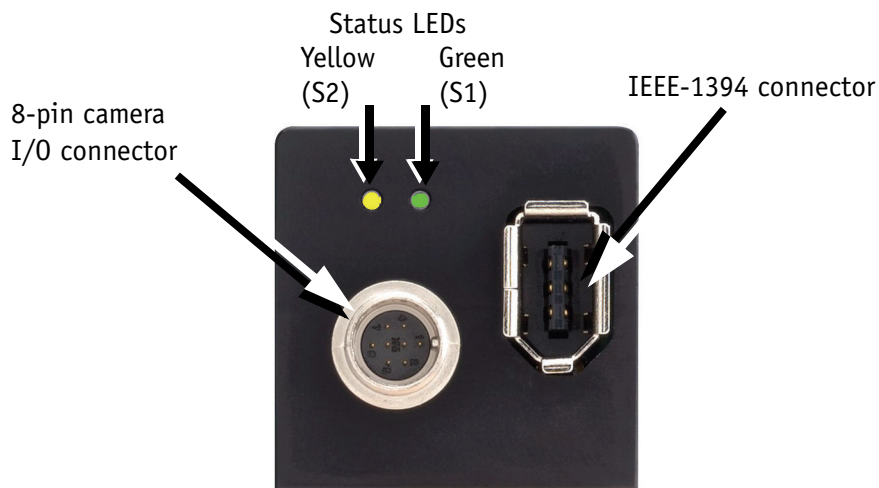


Figure 28: Rear view of camera

## IEEE-1394 port pin assignment

The IEEE-1394 plug is designed for industrial use and has the following pin assignment as per specification:

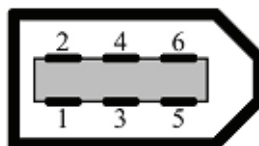


Figure 29: IEEE-1394 connector

Pin	Signal
1	Cable power
2	Cable GND
3	TPB-
4	TPB+
5	TPA-
6	TPA+

Table 17: IEEE-1394 pin assignment

**Note**

Cables with latching connectors on one or both sides can be used and are available with lengths of 4.5 m or 10 m. Ask your local dealer for more details.

## Camera I/O pin assignment

The camera I/O connector is designed for industrial use.

It provides:

- access to the inputs and outputs on the camera
- a serial interface

The following diagram shows the pinning as viewed in pin direction.

### Note



The part number of the appropriate straight I/O connector is:

- HIROSE HR25-7TP-8S, AVT article number K7600503

AVT also supplies various I/O cables at different lengths, a selection is listed below:

I/O cable, open 8-pin HIROSE female to open end, 2.0 m E1000842

I/O cable, open 8-pin HIROSE female to open end, 5 m E1000843



Figure 30: Camera I/O connector pin assignment



Pin	Signal	Direction	Level	Description
1	CameraOut1	Out	TTL	Camera Output 1
2	CameraOut2	Out	TTL	Camera Output 2
3	CameraOut3	Out	TTL	Camera Output 3
4	CameraIn	In	TTL	Camera Input
5	RxD_RS232	In	RS232	Terminal Receive Data
6	TxD_RS232	Out	RS232	Terminal Transmit Data
7	ExtPower		+8 ... 36V	Power Supply
8	GND		GND	Ground

Table 18: Camera I/O pinning

## Status LEDs

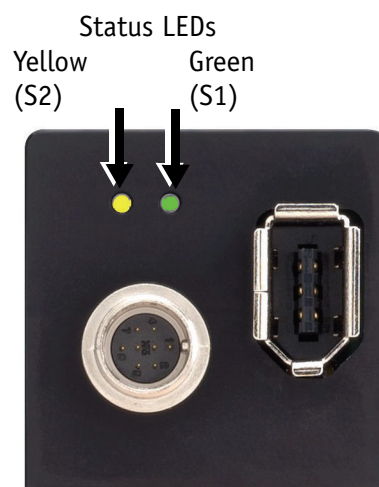


Figure 31: Guppy: LEDs

### On LED (green)

The green power LED indicates that the camera is being supplied with sufficient voltage and is ready for operation.

## Status LED

The following states are displayed via the LED:

State	Description
S1 (green)	LED on - power on LED off - power off
S2 (yellow)	Asynchronous and isochronous data transmission active (indicated asynchronously to transmission over the 1394 bus)

Table 19: LED indication

Blink codes are used to signal warnings or error states:

Class S1 → Error code S2 ↓	Warning 1 blink	DCAM 2 blinks	MISC 3 blinks	FPGA 4 blinks	Stack 5 blinks
FPGA Boot error				1-5 blinks	
Stack setup					1 blink
Stack start					2 blinks
No FLASH object			1 blink		
No DCAM object		1 blink			
Register mapping		3 blinks			
VMode_ERROR_STATUS	1 blink				
FORMAT_7_ERROR_1	2 blinks				
FORMAT_7_ERROR_2	3 blinks				

Table 20: Error Codes

The following sketch illustrates the series of blinks for a Format\_7\_error\_1:

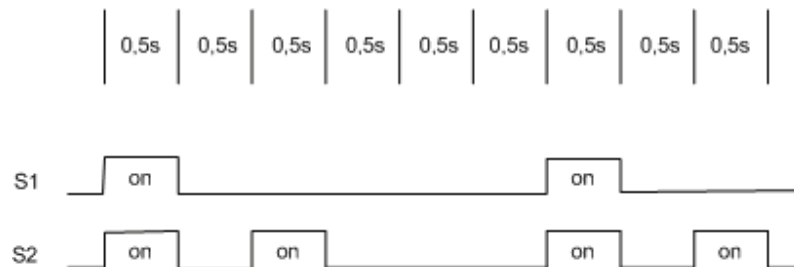


Figure 32: Warning and error states

You should wait for at least 2 full cycles because the display of blinking codes starts asynchronously - e.g. on the second blink from S2.

## Operating the camera

Power for the camera is supplied either via the FireWire™ bus or the camera I/O connector's pin 7.

The input voltage must be within the following range:

Vcc min.: +8 V

Vcc max.: +36 V

### Note



- An input voltage of 12 V is recommended for most efficient use of the camera.
- As mentioned above: The camera I/O connector supplies power to the camera via a diode. This means that there is no power out at pin 7 if the camera is powered via the bus. Consult the factory if you need power output at this pin instead of power in.

## Control and video data signals

The camera has 1 input and 3 outputs. These can be configured by software. The different modes are described below.

### Input

	Absolute Maximum Ratings	Recommended Operating Conditions	Description
Input voltage	-0.5 V ... +7.0 V	0 V ... + 5.5 V	
Input current	50 mA		
Input rise and fall time			Schmitt trigger implemented
Input clamping voltage	24 V		
Input pulse width (min.)		> 1 $\mu$ s	Digital input filter

Table 21: Input characteristics

The inputs can be connected directly to +5 V. If a higher voltage is used, an external resistor must be placed in series.

**Warning** Voltages higher than 24 V DC may damage the camera.



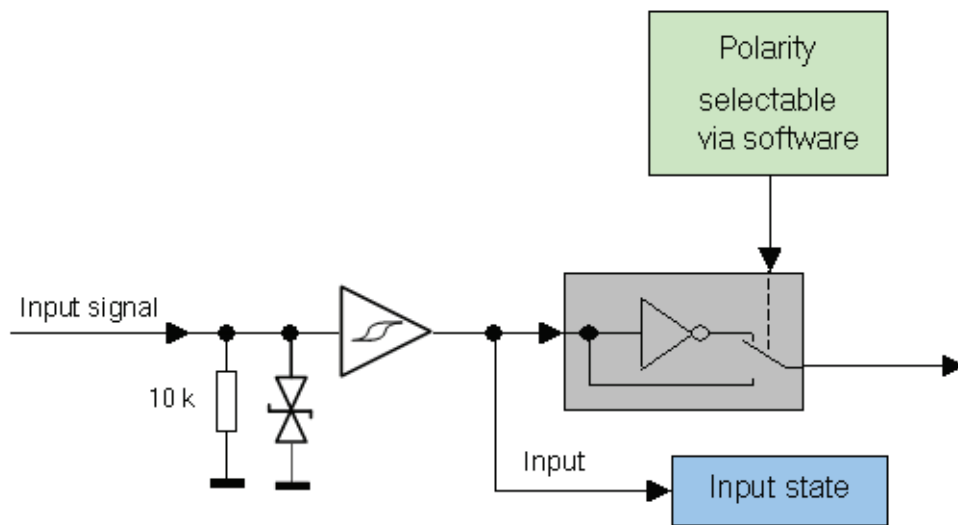


Figure 33: Input block diagram

### Trigger

The signal can be inverted. The camera must be set to **external triggering** to trigger image capture by the trigger signal.

All input and output signals running over the camera I/O connector are controlled by an advanced feature register.

### Outputs

The camera has 3 inverting outputs.

Outputs	Operating Conditions
Output Voltage	0 ... 5.5 V
Output Current	Max. $\pm 20$ mA

Table 22: Output characteristics

Output features are configured by software. Any signal can be placed on any output.

The main features of output signals are described below:

Signal	Description
IntEna (Integration Enable) signal	This signal displays the time in which exposure was made. By using a register this output can be delayed up to 1.05 seconds.
FVal (Frame valid) signal	This feature signals readout from the sensor. This signal FVal follows IntEna.
Busy signal	This signal appears when: <ul style="list-style-type: none"> <li>the exposure is being made or</li> <li>the sensor is being read out or</li> <li>data transmission is active.</li> </ul>

Table 23: Output signals

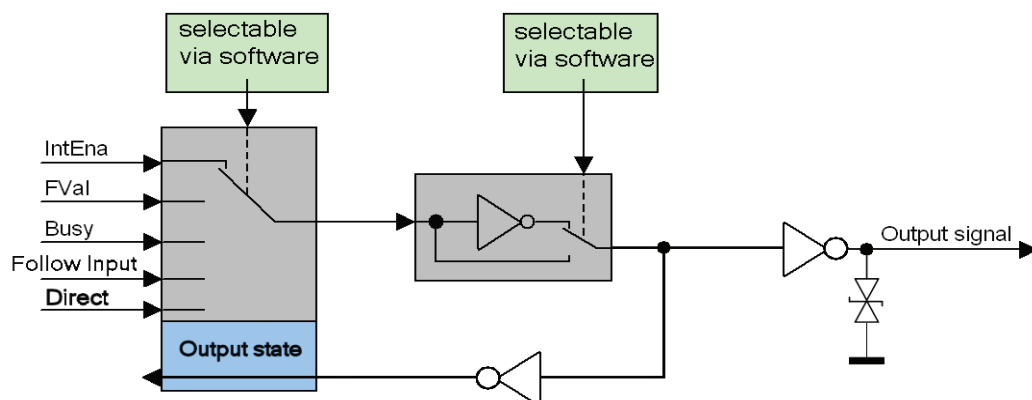


Figure 34: Output block diagram

### Output mode

ID	Mode	Default
0x00	Off	
0x01	Output state follows <b>PinState</b> bit	
0x02	Integration enable	Output 1

Table 24: Output routing

ID	Mode	Default
0x04	Reserved	
0x05	Reserved	
0x06	FrameValid	
0x07	Busy	Output 2
0x08	Follow corresponding input (Inp1 ↔ Out1)	
0x09..0x0F	Reserved	
0x10..0x1F	Reserved	

Table 24: Output routing

The **Polarity** setting refers to the input side of the inverting driver.

## Firmware update

Firmware updates can be carried out without opening the camera.

**Note** Please contact your local dealer for further information.





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